



Spectral Gamma-Ray Borehole Log Data Report

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Borehole

20-08-07

Log Event A

Borehole Information

| | | |
|-------------------------|---------------------------------|----------------------------------|
| Farm : <u>B</u> | Tank : <u>B-108</u> | Site Number : <u>299-E33-195</u> |
| N-Coord : <u>45,306</u> | W-Coord : <u>52,784</u> | TOC Elevation : <u>653.63</u> |
| Water Level, ft : | Date Drilled : <u>3/31/1972</u> | |

Casing Record

| | | |
|----------------------------|--------------------------------|--------------------|
| Type : <u>Steel-welded</u> | Thickness : <u>0.280</u> | ID, in. : <u>6</u> |
| Top Depth, ft. : <u>0</u> | Bottom Depth, ft. : <u>100</u> | |

Borehole Notes:

Borehole 20-08-07 was drilled in March 1972 to a depth of 100 ft. The borehole was completed with 6-in. casing. Data from the drilling log and Chamness and Merz (1993) were used to provide borehole construction information. These references do not indicate that the borehole casing was perforated or grouted. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing.

Equipment Information

| | | |
|-----------------------------------|---|--|
| Logging System : <u>2B</u> | Detector Type : <u>HPGe</u> | Detector Efficiency: <u>35.0 %</u> |
| Calibration Date : <u>11/1997</u> | Calibration Reference : <u>GJO-HAN-20</u> | Logging Procedure : <u>MAC-VZCP 1.7.10-1</u> |

Logging Information

| | | |
|---------------------------------|----------------------------------|---------------------------------------|
| Log Run Number : <u>1</u> | Log Run Date : <u>10/28/1998</u> | Logging Engineer: <u>Alan Pearson</u> |
| Start Depth, ft.: <u>0.0</u> | Counting Time, sec.: <u>100</u> | L/R : <u>L</u> Shield : <u>N</u> |
| Finish Depth, ft. : <u>10.0</u> | MSA Interval, ft. : <u>0.5</u> | Log Speed, ft/min.: <u>n/a</u> |

| | | |
|--------------------------------|----------------------------------|---------------------------------------|
| Log Run Number : <u>2</u> | Log Run Date : <u>10/29/1998</u> | Logging Engineer: <u>Alan Pearson</u> |
| Start Depth, ft.: <u>99.5</u> | Counting Time, sec.: <u>100</u> | L/R : <u>L</u> Shield : <u>N</u> |
| Finish Depth, ft. : <u>9.0</u> | MSA Interval, ft. : <u>0.5</u> | Log Speed, ft/min.: <u>n/a</u> |



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Logging Operation Notes:

This borehole was logged by the SGLS in two log runs. The top of the borehole casing, which is the zero reference for the SGLS, is even with the ground surface. The total logging depth achieved was 99.5 ft.

Analysis Information

Analyst : P.D. Henwood

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 04/12/1999

Analysis Notes :

The pre-survey and post-survey field verification for the logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for a 0.280-in.-thick steel casing was applied to the concentration data during the analysis process.

Shape factor analysis was applied to the SGLS data and provided insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is included. The plot is used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.

Results/Interpretations:

The radionuclide Cs-137 was the only man-made contaminant detected around this borehole. The Cs-137 contamination was detected at intermittent depths between the ground surface and 15 ft. The concentrations were less than 1 pCi/g, except at the ground surface.

An elevated total gamma count rate at about 72 ft exists in the absence of higher than normal naturally occurring radionuclides or other gamma-emitting radionuclides. The cause of these elevated count rates is unknown but could be the result of Sr-90 contamination.



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The K-40 concentrations increase at about 40 ft, representing the transition from the backfill material to the undisturbed Hanford formation sediments.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank B-108.